Support for the Amendments

Support for the amendment to claims 1, 5, and 8 is found, for example, in claims 1, 5, and 8 as originally filed, the definition of "functionality" on page 11, page 15, line 17 - page 17, line 6, page 28, line 23 page 30, line 3, page 47, line 15 – page 48, line 10, and Example 2 on page 59. No new matter has been added.

Rejections under 35 U.S.C. § 102

The amendments presented on April 6, 2006 were made at the suggestion of the Examiner based on Applicants arguments made in the Reply filed January 4, 2006 and the telephonic interview on February 7, 2006. The arguments are reiterated here with reference to the amendments filed on April 6, 2006.

Claims 1-13 stand rejected for anticipation by Capecchi et al. (U.S. Patent No. 5,292,514; hereafter "Capecchi") and Mueller et al. (U.S. Patent No. 4,711,903; hereafter "Mueller").

In order to anticipate a claim, a reference must teach each and every limitation of the claim (M.P.E.P. § 2131). Both claim 1 and claim 5, the independent claims rejected, are directed to methods for making a biomaterial. Each claim requires polymerization of two components through a self selective reaction between a strong nucleophile (i.e., an amine in claim 5) and a conjugated unsaturated bond or a conjugate unsaturated group, where each precursor component includes at least two strong nucleophiles or at least two

conjugated unsaturated bonds or conjugated unsaturated groups. Neither cited reference teaches these limitations.

For Capecchi, the Examiner states that the reference teaches "making a material by [reacting] a thiol to an acrylate via nucleophilic addition." This statement is incorrect. In col. 5, Capecchi teaches that "substrates" include nucleophilic moieties, such as thiols (lines 7-10), but "acrylate" is only mentioned as a component of the substrate that contains the nucleophilic moiety. That is, Capecchi discloses an acrylate polymer having reactive nucleophilic moieties, such as thiols, bound to it. In the section cited by the Office, there is no discussion of any reaction between a thiol and an acrylate. Indeed, a reaction between the thiol and acrylate would be undesirable since the object of this portion of Capecchi is to produce a surface having unreacted thiol groups.

Applicants acknowledge that Capecchi does discuss Michael addition reactions at col. 3, lines 37-42 and col. 7, line 32 – col. 8, line 58. These disclosures involve the reaction of a bridging group with 2-alkenyl azlactone monomers, where a nucleophile in the bridging group adds to the *single* alkene bond in the azlactone. In contrast, the instant claims require the reaction of two components, i.e., a strong nucleophile and a conjugated unsaturated bond or group, where the component having the strong nucleophile includes two strong nucleophilic groups, and the component having the conjugated unsaturated bond or group includes two such bonds or groups. Thus, the teachings of Capecchi with respect to Michael reactions do not anticipate the instant claims, and the rejection should be withdrawn.

The Examiner has also rejected independent claims 1 and 5 over Mueller, based on a reference in col. 3 to the reaction of a thiol with an acrylate. Again, the instant claims require the reaction of two components, each of which has either two strong nucleophiles or two conjugated unsaturated bonds or groups. Both the thiol and the acrylate disclosed in Mueller have a functionality of only one. Furthermore, claim 5 recites the reaction of an *amine*, not a thiol. Thus, the teachings of Mueller on thiols do not anticipate claim 5. This rejection should also be withdrawn.

Rejections under 35 U.S.C. § 112, first paragraph

Claims 1-19 stand rejected for lack of written description with respect to the terms "biomaterial," "sensitive biological molecules," or "cells or tissue." Applicants traverse this rejection. The amendments filed on April 6, 2006 do not address this rejection. For completeness, Applicants have repeated the arguments previously made in the Reply filed January 4, 2006 with respect to this rejection.

M.P.E.P. § 2163.02 states that "[a]n objective standard for determining compliance with the written description requirement is, 'does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed.'" (citations omitted). Furthermore, M.P.E.P. § 2163 states:

> What is conventional or well known to one of ordinary skill in the art need not be disclosed in detail.... If a skilled artisan would have understood the inventor to be in possession of the claimed invention at the time of filing, even if every nuance of the claims is not explicitly described in the specification, the adequate description requirement is met. (citations omitted)

Finally, a single disclosed species may be sufficient to adequately support a genus:

> disclosure of a single method of adheringly applying one layer to another was sufficient to support a generic claim to "adheringly applying" because one skilled in the art reading the specification would understand that it is unimportant how the layers are adhered, so long as they are adhered. (M.P.E.P. § 2163; citations omitted).

The instant claims meet these standards.

With respect to "biomaterial," this term is used to refer to the product of the claimed methods, i.e., the reaction product of the two precursor compounds. Applicants provide numerous examples of possible precursor compounds for use in the claimed methods, including oligomers, polymers, biosynthetic proteins or peptides, naturally occurring peptides or proteins, processed naturally occurring peptides or proteins, and polysaccharides (page 3, lines 12-14). Further examples of polymer components include poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(ethylene-co-vinyl alcohol), poly(acrylic acid), poly(ethylene-co-acrylic acid), poly(ethyloxazoline), poly(vinyl pyrrolidone), poly(ethylene-co-vinyl pyrrolidone), poly(maleic acid), poly(ethylene-co-maleic acid), poly(acrylamide), or poly(ethylene oxide)-co-poly(propylene oxide) block copolymers (page 3, lines 14-18). Numerous peptide sequences that may be employed are also provided, including those having an adhesion site, a growth factor binding site, or a protease binding site (see Table 1, page 44, Table 2, page 45, Table 3, page 46, Table 4, page 52, and Table 5, page 53). Furthermore, Applicants provide an extensive list of reactive groups, both nucleophiles (pages 38-40) and conjugated unsaturated bonds or groups (pages 31-38), through which the precursors are linked. Finally, Applicants have provided substantial guidance on the possible

reactions between the two precursor components (pages 47-50). Since Applicants have provided representative examples of the precursors, their reactive components, and their manner of linkage, one skilled in the art would understand that Applicants have invented what is claimed. This rejection may be withdrawn.

With respect to the terms "sensitive biological molecules" and "cells or tissue," these terms are employed to refer to substances in the presence of which the present methods may be performed. One skilled in the art reading the instant specification would understand that the instant methods are directed to methods of making a biomaterial through the reaction of two precursor components via a self selective reaction between a strong nucleophile and a conjugated unsaturated bond or group. The self selective nature of the reaction instantly claimed allows for the reaction to take place in the presence of molecules, cells, or tissues without substantial incorporation of such molecules, cells, or tissues into the biomaterial. Accordingly, the precise nature of these molecules, cells, or tissues around which a biomaterial is formed is not critical for the instant methods. Moreover, the specification lists peptides, proteins, nucleic acids, and drugs as examples of sensitive biological molecules (page 12, lines 18-19). The terms "cells" and "tissues" are conventional and well known in the art. The specification further provides examples of the source of such cells or tissues: bone, skin, nerve, blood vessel, cartilage, lung, dura barrier, and intestine (page 6, line 26 to page 7, line 1 and page 7, lines 12-13). One skilled in the art would understand that Applicants were in possession of the invention as claimed, and these rejections may be withdrawn.

Information Disclosure Statements

Applicants note that the Forms PTO 1449 that were submitted with Information Disclosure Statements mailed on December 8, 2003, January 26, 2004, November 17, 2004, and May 18, 2005 have not been initialed and returned, and hereby request that they be initialed and returned with the next Office action.

CONCLUSION

Applicants submit that the claims are in condition for allowance, and such action is respectfully requested. Kindly apply any charges, or any credits, to Deposit Account No. 03-2095.

Respectfully submitted,

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